BQ

19 **FEDERAL REPUBLIC OF GERMANY**

GERMAN PATENT OFFICE

12 **Disclosure Specifications**

10 **DE 44 39 914 A1**

21 File number: P 44 39 914.6
22 Application date: 11/08/94
43 Disclosure date: 05/09/96

51 Int. Class.[6]:
B 65 D 23/08
B 65 D 1/22
//B65G 47/49,
B65D 88/12,
B65B 61/02,
B65D 90/48

DE 44 39 914 A1

71 Applicant:
Müller, Gotthard, 97941
Tauberbischofsheim, DE

74 Representative:
Barske, H., Dipl.-Phys. Dr.re.nat., Patent Attorney, 81245 Munich

72 Inventor:
Same as applicant

A search request according to Paragraph 44 PatG was filed.

54 A goods container fitted with a transponder

57 The invention concerns a container for goods fitted with a transponder as an information carrier, whose information can be read and/or programmed with the help of an electromagnetic high-frequency field. The transponder (22) is placed into a recess or hollow area (20) of the container for goods (2) and is thus protected from mechanical damage.

The following data were taken from the documents filed by the applicant.

FEDERAL PRINTING SHOP 03.96 602 019/427

Description

The invention concerns a container for goods fitted with a transponder in accordance with the preamble of claim 1.

The use of computer-controlled data processing systems is becoming increasingly important in reducing costs for storage facilities and transport systems. Systems commonly found in practical applications consist of information carriers with optical information, such as a bar code, that are glued to a container for goods or to the goods themselves, are directly printed on them and can be read with an optical laser unit to appropriately control the production, storage and/or further path of the respective selected goods.

These optical information carriers exhibit the characteristic that they cannot be changed after they have been affixed to the respective goods or containers. Furthermore, there exists the risk that the information can no longer be read if it has a dirty surface or mechanical surface damage.

Identification systems based on high frequency, i.e., the so-called RF-ID systems (radio frequency identification systems) have begun to appear in recent times. Such systems are described, for example, in the magazine Elektronik 9/93, page 86 through 92. The basic structure of such systems consists of a so-called transponder as information carrier and a so-called base station that can be connected to a computer system and is fitted with an antenna to communicate with the transponder. The data exchange between base station and information carriers or transponders occurs by way of a magnetic or electro-magnetic high-frequency field. Frequencies used are around 125 kHz and up to a few MHz. The transponder operates without an external battery and can be made very small. The transponder is fitted with an antenna, logic system and memory. The high-frequency field is used to supply it with the required energy. The data transfer is achieved with modulation. The storage medium in the transponder generally consists of EEPROM cells or laser-programmed ROMs. The system uses read-only systems for use with information carriers as EPROMs and ROMs. The memory for programmable read/write systems is provided with EEPROM cells offering a relatively high storage capacity. The distance between the transponder and the base station antenna may be a few tens of centimeters as a function of the technology used and the available energy.

The practical application of identification systems using transponders has so-far been limited to relatively expensive goods and those that must be handled with care, since the transponders themselves are relatively expensive and since rough handling brings the risk of damage and thus transponder loss and of identification errors by the system.

The task of the invention consists in making the advantages exhibited by identification systems using transponders, i.e., high reliability, flexibility and greatest freedom for the arrangement of read antenna and transponder, available to other fields of application.

This task is solved by the features of the main claim. Containers of the widest variety of types for goods are used increasingly to transport goods and also to protect the environment, i.e., they remain in service for a long time. Accordingly, cost relating to the integration of such containers in a computer-controlled identification and control system can be distributed to many goods, thus making it possible to replace the aforementioned optical identification systems with more expensive and flexible systems that use transponders. When the transponder is arranged in a pocket of the container for goods, it is protected and can then be transported with the container for goods as long it remains in service. It is thus possible to use all logistic advantages offered by

the modern identification systems. A particularly safe arrangement of the transponder when observing the features of claim 2 is achieved.

The features of claim 3 further increase the operational safety and also produce the benefit that the transponder attachment to the container for goods does not increase the component cost from a practical point of view. The transponder integrated in the container for goods can be programmed externally to indicate the goods carried by the container, i.e., with the use of a programmable memory module.

The features indicated in claim 4 open the possibilities to use modern transport technology, particularly for the beverage industry, in which case the transponder can be installed later in bottle cases that have already been manufactured and in a manner that protects it safely.

The features of claim 5 relate to the attachment of transponders to modern multi-path bottles consisting of at least two shells and they open new possibilities for the logistics system of the bottle industry.

The claims in claim 6 represent an advantageous further development of those described in claim 5, since the concave bottom of the bottle is particularly suited to withstand high mechanical forces.

Claims 7 through 10 address further developments of the invention for its application on transport pallets.

The invention shall be explained in the following with the help of schematic representations and with details. The figures show the following:

Figure 1 shows an elevation of a bottle case;

Figure 2 shows a top view of the bottle case in the form of section II-II indicated in Figure 1;

Figure 3 shows an enlarged detailed elevation of Figure 2;

Figure 4 shows a cross-section view of a bottle;

Figure 5 shows an elevation view of a transport pallet with forklift;

Figure 6 shows a top view of the transport pallet indicated in Figure 5;

Figure 7 shows an elevation view of a modified design form, i.e., in comparison with that shown in Figure 5;

Figure 8 shows a top view of the arrangement according to Figure 5;

Figure 9 shows a cross-section view of a pallet loaded onto a transport device and

Figure 10 shows a top view of the arrangement shown in Figure 9.

Figure 1 shows bottle case 2 that is fitted with openings 4 in its side walls to serve as handles.

According to Figure 2, that shows a top view of the bottle case in the form of section II-II indicated in Figure 1, bottle case 2 has stiffeners 10 arranged at its longitudinal sides 6 and 8, through which webs 12, that divide the inside of the bottle case into individual compartments, are connected to lateral sides 6 and 8. The individual compartments will accommodate bottles 14. The connecting areas between the individual sides are reinforced with stiffeners 16.

As shown in Figure 3, stiffener 10 is formed by having side 6 through symmetrically arranged webs 18 transition into web 12, thus forming hollow volume 20 in stiffener 10 that in generally known bottle cases is open at the bottom and closed at the top. Adjacent to longitudinal side 6, transponder 22 is installed in hollow volume 20; it may be glued to the inside of longitudinal side 6 or may be attached to it in another manner. Accordingly, transponder 22 is fully protected from outside mechanical effects, is safely nestled in bottle case 2 and will be available as information carrier for the whole service life of bottle case 2. It is understood that

transponder 22 can also be arranged inside the hollow volumes formed at the edges of the bottle case or it can be poured into one of the side walls of the bottle case during the manufacture of a bottle case made of plastic, thus fully protecting the transponder from mechanical forces.

The design of transponder 22 is generally known and it forms a component of an identification system whose design and use is also known and thus not explained here in more detail. The arrangement of transponder 22 in accordance with the invention exhibits the advantage that transponder 22 can be safely read and programmed despite its fully protected position, since an antenna of a read device or a base station connected to a related data processing system is separated from transponder 22 only by the side wall that is thin in the area of stiffener 10 or the alternating electro-magnetic field must only penetrate the thin side wall 6. The diameter of transponders used in practical applications varies between 20 mm and 30 mm. The transponder can be safely read or programmed with an antenna located 20 cm from it and at a moving velocity of 1 m/s.

Figure 4 shows a section through bottle case 14 fitted with transponder 22. Bottle 14 has two shells and has inside shell 24 made of glass thus making the bottle suitable for any liquid and particularly for beverages. Inside shell 24 is coated with outside shell 26 or is enclosed by it. Transponder 22 is arranged in the area of the concave bottom 28 of bottle 14 between inside shell 24 and outside shell 26. The manufacture is preferably performed such that transponder 22 is attached to inside shell 24 prior to the manufacture of outside shell 26, thus achieving a safe position for transponder 22 between inside and outside shell, i.e., covered by outside shell 26. Accordingly, the bottle in accordance with the invention can be used in a logistically advantageous manner in identification systems for its whole service life.

Figure 5 shows transport pallet 30 used to transport the widest variety of goods, i.e., from products manufactured by the construction industry into groceries. The design of transport pallet 30 is generally known and, in the design example shown, consists of a floor made of floor boards 32 on which the goods to be transported rest. Floor boards 32 are connected with cross boards 34 thus creating an inherently stable floor. Wooden blocks 36, that themselves are connected with floor beams 38 formed like boards, are attached to connecting boards 34 to permit the transport pallet 30 or the floor to be lifted. Between floor beams 38 and connecting boards 34 are thus formed long openings into which the fork arms 40 of forklift 42 can be pushed.

To make transponder pallet 30 accessible to modern logistic identification systems, transponder 22 is safely installed at one of floor beams 38 by placing it in a recess between one of floor beams 38 and one of the wooden blocks. It is clear that many possibilities exist to safely install transponder 22 at transponder pallet 30. It is possible, for example, to place transponder 22 into a recess of one of floor beams 38 and to cover the whole with a wooden board.

At a point that is close to transponder 22 when the pallet is placed, one of fork arms 40 is fitted with antenna 44 of a read and/or programming device of the identification system to permit reading and/or programming of transponder 22. Antenna 44 is connected to the related equipment through line 46. Antenna 44 is appropriately cast in a plastic block that is placed in a recess of the respective fork arm 40 to prevent damage.

As shown in the design example of Figure 6, transponder 22 is not attached immediately below antenna 44 that is attached laterally to fork arm 40. It is understood that there exist many different arrangements that are limited only by the allowable distance and the relative alignment between transponder 22 and antenna 44.

Figures 7 and 8 show a design form for the pallet and fork lift that differs from the design form shown in Figures 5 and 6 by the fact that fork arms 40 of the forklift are long enough to

permit the forklift to lift two transport pallets. As a result thereof, fork arms 40 of forklift 42 are fitted with two antennas 44.

Figures 9 and 10 show how transport pallets 30 fitted with transponder 22 in accordance with the invention can be integrated in a transport system. The figures show transport pallet 30 fitted with transponder 22 and placed on a transport device. Transport system 48 has a conveyor or transport rollers and is fitted with antenna 44 to read and/or program transponder 22 that is connected to the respective data processing system through line 46. By attaching transponder 22 very close to the bottom of transport pallet 30 that is placed on transport device 48, antenna 44 can be arranged very close to the transponder, thus increasing the safety of the interaction between data processing system and transponder, since the alternating electro-magnetic field needed to produce the required energy must pass only through the conveyor (if present) and floor beam 38 to read and/or program transponder 22.

Pallet transponders used in practical applications have a diameter of 90 mm and can be read at moving velocities of 1 m/s and at a distance of 1 m.

To summarize, it can be stated that the invention opens the doors for the use of modern logistic data processing systems for systems working with containers for goods and particularly with containers for goods that are used repeatedly. The transponder arranged at the respective container for goods can be fully programmed to indicate the goods, can be programmed only when the container for goods is being loaded and can be reprogrammed on or in the container for goods when the type of goods changes, thus making it possible to use the advantages offered by modern logistic systems. The transponder is safely attached to the container for goods and will be available for the whole service duration of the container for goods.

Patent claims

1. A container for goods fitted with a transponder (22) as information carrier, whose information can be read and/or programmed with the help of an electro-magnetic high-frequency field, **characterized by the fact that** the transponder (22) is arranged in a recess (20) of the container for goods (2, 14, 30).
2. A container for goods in accordance with claim 1, characterized by the fact that the transponder (22) is arranged in a hollow volume (20) of the container for goods (2).
3. A container for goods in accordance with claim 1 or 2, characterized by the fact that the transponder (22) is incorporated in the container for goods (2, 14) during its manufacture.
4. A container for goods in accordance with claim 1 or 2, characterized by the fact that the container for goods consists of a bottle case (2) exhibiting a stiffener rib (10) that encloses the hollow volume (20) in the side wall (6, 8), and that the transponder (22) is arranged in the hollow volume (20) of the stiffener rib (10).
5. A container for goods in accordance with one of claims 1 through 3, characterized by the fact that the container for goods consists of a bottle (14) consisting of an inside shell (24) and an outside shell (26), and that the transponder (22) is arranged between the inside and outside shell.
6. A container for goods in accordance with claim 5, characterized by the fact that the transponder (22) is arranged in the area of the concave bottom (28) of the bottle.
7. A container for goods in accordance with claim 1 or 2, characterized by the fact that the container for goods consists of a transport pallet (30).
8. A container for goods in accordance with claim 7, characterized by the fact that the transport pallet (30) has a floor (32, 34) to support the goods to be transported and has a floor beam (38), in which case a long opening is formed between floor beam and floor to accept a fork arm (40) of a forklift (42), and that the transponder (22) is arranged in the floor beam (38) in an area adjacent to the long opening.

9. A forklift to transport a pallet in accordance with claim 7 or 8, characterized by the fact that an antenna (44) forming a part of a read and/or programming device for the transponder (22) is integrated in one fork arm (40) of the forklift (42).

10. A transport device to transport a pallet in accordance with claim 8, characterized by the fact that an antenna (44) forming a part of a read and/or programming device for the transponder (22) is arranged in the area of the top side of a transport device on which the transport pallet (30) rests.

---

5 pages with drawings form a part of this document

This page left blank intentionally

DRAWING PAGE 1

Number: **DE 44 39 914 A1**
Int. Class.[6]: **B 65 D 23/08**
Disclosure date: May 9, 1996

Fig. 1

Fig. 2

Fig. 3

Number: **DE 44 39 914 A1**
Int. Class.[6]: **B 65 D 23/08**
Disclosure date: May 9, 1996

Fig. 4

Number: **DE 44 39 914 A1**
Int. Class.[6]: **B 65 D 23/08**
Disclosure date: May 9, 1996

Fig. 5

Fig. 6

Number: **DE 44 39 914 A1**
Int. Class.[6]: **B 65 D 23/08**
Disclosure date: May 9, 1996

Fig. 7

Fig. 8

Number: **DE 44 39 914 A1**
Int. Class.[6]: **B 65 D 23/08**
Disclosure date: May 9, 1996

Fig. 9

Fig. 10